REMARKS

This amendment, submitted in response to the Office Action dated November 6, 2002 is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

As a preliminary matter, the Examiner has acknowledged Applicants' claim for foreign priority and receipt of the certified copy of the priority documents. Applicant respectfully requests that the Examiner permit review of the drawings by an Official Draftsperson. Upon review, corrected drawings will be submitted and Applicant requests that a completed PTO-948 be included in the next Office Action.

Claims 1-28 remain pending in the application. Claims 2, 5, 8, and 14 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claims 2, 5, and 14 are rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements. Claim 8 is also rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential elements. Applicant submits the following arguments in traversal of the rejections.

Applicant has amended the claims as shown in the Appendix to overcome all the Examiner's rejections under § 112, second paragraph. It is believed that no new matter is raised.

As for the rejections based on prior art, Claims 1-3, 5-24 are rejected under 35 U.S.C. § 102(b) as being anticipated by Sonoda (JP10254001). Applicant submits that Sonoda and the present invention are commonly assigned to Fuji Photo Film Co., Ltd. Claims 4, and 25-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sonoda (JP10254001) in

view of Nagai et al (U.S. Patent No. 5,617,435). In view of the cited references, Applicant submits the following arguments in traversal of all the rejections and Applicant also submits new dependent claims 29-32 to further define the invention.

Applicants' invention relates to a light wavelength conversion module which converts a fundamental wave to a second harmonic wave or the like by using a light wavelength conversion element. The light wavelength conversion element is formed of a bulk-shaped wavelength conversion crystal. The bulk-shaped wavelength conversion crystal is formed of a crystal base and periodic domain reversing segments along the direction of a fundamental light. It is noted that the periodic domain reversing segments penetrate from one surface to another surface of the crystal base.

Sonoda relates to a light wavelength converting module including a semiconductor laser, a collimator lens, a condensing lens, a narrow-band pass filter, and a light wavelength conversion element. The light wavelength conversion element includes a channel optical waveguide which includes a channel through which the light transmitted by the semiconductor laser travels.

In the Office Action, the Examiner rejected claims 1-3, and 5-24 under § 102(b) as being anticipated by Sonoda. Amended claim 1 recites a light wavelength conversion module comprising "a light wavelength conversion element formed of a bulk-shaped wavelength conversion crystal, said light wavelength conversion element being for converting a wavelength of a fundamental wave . . . ." Nowhere in Sonoda is there any explicit mention of a bulk-shaped wavelength conversion crystal recited in a combination with other features of claim 1.

Applicant also submits that a wavelength conversion crystal and a channel optical waveguide are different devices. In a wavelength conversion crystal, the laser beam travels through alternating layers of crystal base and domain reversing segments, as shown in FIGS. 1, 3, 4, 5A, and 7-25 of the Applicants' invention. In contrast, a laser beam traveling in the light wavelength conversion module as taught by Sonoda does not travel through alternating layers of crystal base and domain reversing segments, but through a channel. In what appears as FIG. 2 in Sonoda shows channel 18 through which the laser beam travels. As the Examiner has not shown how the wavelength conversion crystal as recited in claim 1 is inherently disclosed to one skilled in the art, and Sonoda fails to teach each and every element of the claim, Applicant submits that claim 1 is patentable.

For the reasons discussed with respect to claim 1, claims 2, 3, 5-7, 9, 19, and 20 are believed to be patentable because Sonoda fails to teach a wavelength conversion crystal as recited in the claims. Dependent claims 8, 10-18, and 21-24 are believed to be patentable for at least the same reasons discussed above for the patentability of the base claims 2, 3, 5-7, 9, 19, and 20.

Claims 4, and 25-28 are rejected under § 103(a) as being unpatentable over Sonoda in view of Nagai et al.

Nagai relates to a lasing system using a wavelength-conversion waveguide within which a semiconductor laser light is propagated while at the same time being converted into second-harmonic light. In traversal of the Examiner's rejection, Applicant submits that claims 4 and 25-27 are patentable because claims 4, 25-27, and claims 3 and 1, the base claims from which

claims 4, and 25-27 depend from, all recite a wavelength conversion crystal in combination with other elements. Nowhere in Sonoda or in Nagai is there any mention of a wavelength conversion crystal. As discussed above, wavelength conversion waveguides and wavelength conversion crystals are not the same.

Further, the Examiner has not shown how a wavelength conversion crystal as recited in claims 4, and 25-27 is well known in the art or that there is a suggestion to modify Sonoda in view of Nagai to render claims 4, and 25-27 obvious.

In addition, in Sonoda, only TE mode is propagated. This is because a direction perpendicular to a $LiNbO_3$, crystal surface of the $LiNbO_3$ substrate is the x-axis, and a direction at a right angle to a propagation direction of the light is the z-axis. In Nagai et al., a direction perpendicular to the $LiNbO_3$, crystal surface is the z-axis. Accordingly, only TM mode is propagated in Nagai et al. In view of the different modes of propagation, the references would not be combined.

In the present invention, the fundamental wave is propagated within a crystal (without forming a wavelength guide) in which domain reversing segments are formed. To the extent domain reversal regions are formed in the art, the formation occurs in a wavelength guide.

Additionally, or in the alternative, claim 4 depends from claim 3 which expressly recites "a light wavelength conversion element formed of a bulk-shaped wavelength conversion crystal." On the contrary, Sonoda fails to mention a bulk-shaped wavelength conversion crystal and Nagai explicitly teaches away from the use of "bulk materials" (col. 1, lines 33-37).

Moreover, the Examiner has noted the deficiency of Sonoda with regard to a modulation element and cites Nagai to make up for the deficiency. However, the Examiner has offered no motivation as to why one skilled in the art would combine the teachings of the references and thus has failed to set forth a prima facie case of obviousness.

For the reasons above, claims 4, and 25-27 are believed to be patentable.

Although the Examiner has rejected claim 28, Applicant submits that the Examiner has not addressed how the light scanning and recording apparatus as recited in claim 28 is obvious in view of the cited references. As the Examiner has failed to present arguments for the obviousness of claim 28, claim 28 is patentable.

Applicant submits new dependent claims 29-32. Claims 29-32, which ultimately depend from claim 1, are believed to be patentable for the reasons discussed above for claim 1.

Alternatively or in addition, claim 29 is patentably distinct with respect to Sonoda or Nagai or both because the references do not teach domain reversing segments which penetrate from a first surface of the crystal to a second surface of the crystal.

As for claim 30, the two references do not teach a fundamental wave which travels through alternating layers of domain reversing segments and crystal. Moreover, Sonoda nor Nagai do not indicate that the missing features of claims 29 and 30 are well known in the art or that there is a suggestion to modify Sonoda in view of Nagai to render claims 29 and 30 obvious.

Alternatively or in addition, claims 31 and 32 are believed to be patentable for the reasons discussed above for claims 29 and 30.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims are amended as follows:

1. (Amended) A light wavelength conversion module comprising:

(a) a light wavelength conversion element formed of a bulk-shaped wavelength conversion crystal, said light wavelength conversion element being for converting a wavelength of a fundamental wave, said light wavelength conversion element having an end surface;

(b) a semiconductor laser for emitting a laser beam for entering said light wavelength conversion element as the fundamental wave; and

(c) a transmission type wavelength selecting optical element disposed between said semiconductor laser and said light wavelength conversion element, said wavelength selecting optical element selecting a wavelength of the laser beam which is reflected by an end surface of said light wavelength conversion element and is to be fed back to said semiconductor laser.

2. (Amended) A light wavelength conversion module comprising:

a light wavelength conversion element formed of a bulk-shaped wavelength conversion crystal, said light wavelength conversion element converting a wavelength of a fundamental wave;

a semiconductor laser emitting a laser beam which is to enter said light wavelength conversion element as the fundamental wave;

a light separating device for separating a part of the laser beam before the laser beam enters into said light wavelength conversion element;

a reflecting member reflecting the separated laser beam so as to feed back the separated laser beam to said semiconductor laser; and

a transmission type wavelength selecting optical element selecting a wavelength of the reflected laser beam which is to be fed back to said semiconductor laser via the light separating device.

5. (Amended) A light wavelength conversion module comprising:

a light wavelength conversion element formed of a bulk-shaped wavelength conversion crystal, said light wavelength conversion element converting a wavelength of a fundamental wave;

a semiconductor laser emitting a laser beam which is to enter said light wavelength conversion element as the fundamental wave;

a reflecting member reflecting a laser beam emitted from said semiconductor laser as a backward emitted light, which is directed in a direction other than toward said light wavelength conversion element, so as to feed back the laser beam to said semiconductor laser; and

a transmission type wavelength selecting optical element which selects a wavelength of the reflected laser beam which is to be fed back to said semiconductor laser.

8. (Amended) A light wavelength conversion module according to claim 7, further comprising a light modulation device and an optical system which separates a wavelength-

modulated wave from the laser beam which has exited from said light wavelength conversion element.

Claims 29-32 are added as new claims.